

282. THE INCLUSIVE REACTION $\gamma p \rightarrow \pi^- + \text{ANYTHING}$ IN THE ENERGY RANGE FROM 3 GeV TO 6.3 GeV
 W. Struczinski, I. Derado, P. Dittmann, V. Eckardt, G. Hentschel, V. Heynen, P. Joos, G. Knies, J. Knobloch, G. Kronseder, A. Ladage, E. Maier, H. Meyer, B. Naroska, D. Notz, E. Rabe, P. Schacht, P. Söding, S. Wolff (Aachen-Hamburg-Heidelberg-München Collaboration)

We report on the momentum distribution of π^- mesons in the reaction $\gamma p \rightarrow \pi^- + \text{anything}$. The data are from a photoproduction experiment in a streamer chamber. Because we used a tagged photon beam, the energy of the incoming photon is known to ± 60 MeV. The distributions of the longitudinal and transverse momentum components show no significant energy dependence. When the distributions are normalized to the total cross section $\sigma_{\text{TOT}}(\gamma p)$, their absolute values and shapes are nearly the same as obtained by other experiments with hadron beams. We interpret this result as evidence for scaling behavior in photoproduction.

283. MEASUREMENT OF THE REACTION $\gamma p \rightarrow \pi^+ \pi^-$ WITH TAGGED PHOTONS OF 3-6 GeV IN A STREAMER CHAMBER AT DESY
 P. Dittman, J. Knobloch, E. Rabe, I. Derado, V. Eckardt, G. Hentschel, V. Heynen, P. Joos, G. Knies, G. Kronseder, A. Ladage, E. Maier, H. Meyer, B. Naroska, D. Notz, P. Schacht, P. Söding, W. Struczinski, S. Wolff (Aachen-Hamburg-Heidelberg-München Collaboration)

The reaction $\gamma p \rightarrow \pi^+ \pi^-$ was measured in a 1 m streamer chamber with a liquid hydrogen target in a tagged photon beam at DESY. Of the 2083 ρ^0 mesons obtained, results are given in the three energy intervals 3.1-4.0 GeV, 4.1-5.0 GeV and 5.0-6.2 GeV.

284. REFINED VECTOR MESON DOMINANCE ANALYSIS OF SINGLE PION ELECTRO-PRODUCTION
 H. Fraas, D. Schildknecht (DESY)

Vector meson dominance predictions using all available $\pi^+ p \rightarrow \rho^0 n$ data are compared with single pion electroproduction. The longitudinal electroproduction contribution is directly predicted from the longitudinal ρ^0 production. Deviations exist at small $q^2 = -0.26 \text{ GeV}^2/c^2$. Better agreement is found for $q^2 = -0.75 \text{ GeV}^2/c^2$.

285. PRECISE DETERMINATION OF ρ, ω INTERFERENCE PARAMETERS FROM PHOTO-PRODUCTION OF VECTOR MESONS OFF NUCLEON AND NUCLEI
 H. Alvensleben, U. Becker, W. Busza, M. Chen, K. J. Cohen, R. T. Edwards, P. M. Mantsch, R. Marshall, T. Nash, M. Rohde, H. F. W. Sadrozinski, G. H. Sanders, H. Schubel, Samuel C. C. Ting, Sau Lan Wu (Cambridge and DESY)

We have studied ρ, ω interference in dipion photoproduction in the energy range 5-7 GeV with a total of 630,000 pion pairs in hydrogen, carbon and lead. The mass spectra show clear interference in the vicinity of the omega mass. We obtain the interference parameters $\epsilon = 0.0106 \pm 0.0012$, $\alpha = (96 \pm 15)^\circ$ and $\Gamma_{\omega \rightarrow 2\pi} / \Gamma_{\omega \rightarrow \text{all}} = (1.22 \pm 0.30)\%$, where the errors include model dependent uncertainties and are twice the size of the statistical errors alone.

286. DETERMINATION OF THE PHOTOPRODUCTION PHASE OF ϕ MESONS
 H. Alvensleben, U. Becker, W. Busza, M. Chen, K. J. Cohen, R. T. Edwards, P. M. Mantsch, R. Marshall, T. Nash, M. Rohde, H. F. W. Sadrozinski, G. H. Sanders, H. Schubel, Samuel C. C. Ting, Sau-Lan Wu (Cambridge and DESY)

We have measured wide angle electron-positron pairs from the reaction $\gamma + C \rightarrow C + e^+ + e^-$ in the invariant mass region $920 < m < 1080$ MeV for incident photon energy $6.0 < k < 7.4$ MeV. The photoproduction amplitude of the ϕ meson was found to deviate from pure imaginary by $25^\circ \pm 15^\circ$ corresponding to a ratio of the real to imaginary part of the ϕ -nucleon amplitude of $\beta = -0.48^{+0.33}_{-0.45}$. The forward photoproduction cross section $d\sigma/dt (t=0) (\gamma + C \rightarrow C + \phi)$ was found to be $96 \pm 14 \text{ nb}/(\text{GeV}/c)^2$.

287. UPPER LIMIT ON $\phi \rightarrow \pi^+ \pi^-$ DECAY
 H. Alvensleben, U. Becker, W. Busza, M. Chen, K. J. Cohen, R. T. Edwards, P. M. Mantsch, R. Marshall, T. Nash, M. Rohde, H. F. W. Sadrozinski, G. H. Sanders, H. Schubel, Samuel C. C. Ting, Sau Lan Wu (Cambridge and DESY)

A high statistics measurement of π pairs photoproduced from carbon was performed in the pair mass region 900-1150 MeV. An upper limit of 0.05% is obtained for the branching ratio $\Gamma_{\phi \rightarrow 2\pi} / \Gamma_{\phi \rightarrow \text{all}}$ assuming coherent production.

288. NEW EVIDENCE ON THE PHOTOEXCITATION OF $I = 1/2$ NUCLEON ISOBARS.
 C.A. Heusch, W.A. McNeely, B.D. Winstein, S.J. Yellin, (California Institute of Technology)

We report briefly on the progress of our investigations into the photoexcitation of nucleons and subsequent decay into nucleon plus pseudoscalar meson. The experimental work was done at the CalTech 1.5 GeV electron synchrotron; the data analysis is essentially finished, but work is still progressing on the interpretation of the data obtained.

Our principal interest lies in the measurement of transition amplitudes

$$\gamma N \rightarrow N^* (I = 1/2)$$

where the mass of the nucleon isobars is below $2 \text{ GeV}/c^2$. In this channel, the $J = 1/2$ partial amplitudes are particularly hard to disentangle.

289. PHOTODISINTEGRATION STUDIES OF He^3
 C.A. Heusch, R.V. Kline, K.T. McDonald, and C.Y. Prescott (California Institute of Technology)

We have measured the differential cross-section for two-body photodisintegration of Helium-3,

$$\gamma + \text{He}^3 \rightarrow p + d$$

for incident photon energies from 200 to 500 MeV. Data were taken at center of mass angles from 30° to 150° in 30° steps, as well as at 75° . These energies and angles were chosen so as to investigate the contribution of the $\Delta(1236)$ resonance in the S-channel. The presence of the Δ would appear centered at a photon energy of about 300 MeV. The width of a "bump" in the cross-section due to the Δ is broadened by the relative momentum of the Δ and the other two nucleons in the intermediate state. This broadening should be large because isospin conservation requires the two non-resonant nucleons to be in an $I=1$ state, the simplest of which is an unbound 4S_0 configuration. In contrast, the photodisintegration of the deuteron shows a clear resonance bump at photon energy near 270 MeV.

290. AN EXPERIMENTAL METHOD FOR STUDYING PION-VECTOR MESON ELASTIC SCATTERING AMPLITUDES
 G. Alexander, I. Bar-Nir, J. Grunhaus, A. Levy (Tel-Aviv)

Within the framework of the vector dominance model, a method for an experimental study of the energy dependence of the pion-vector meson scattering amplitudes is proposed for the reaction $\gamma N \rightarrow \Delta V^0 N$. The method is based on an analysis of the moments of the spherical harmonics of the $\gamma N \rightarrow V^0 N$ process. This analysis is attractive, in particular, in the case that s-channel helicity conservation can be assumed for the $V^0 N$ scattering process where then all the moments $\langle Y_{\ell m} \rangle$ with $m \neq 0$ vanish.

291. REFINED VECTOR MESON DOMINANCE ANALYSIS OF SINGLE PION ELECTRO-PRODUCTION
 H. Fraas, D. Schildknecht (DESY)

Vector meson dominance predictions using all available $\pi^+ p \rightarrow \rho^0 n$ data are compared with single pion electroproduction. The longitudinal electroproduction contribution is directly predicted from longitudinal ρ^0 production. Deviations exist at small $q^2 = -0.26 \text{ GeV}^2/c^2$, better agreement is found for $q^2 = -0.75 \text{ GeV}^2/c^2$.

292. COINCIDENCE MEASUREMENT OF BACKWARD INELASTIC ELECTROPRODUCTION
 C. N. Brown, C. R. Canizares, W. E. Cooper, A. M. Eisner, G. J. Feldman, C. A. Lichtenstein, L. Litt, W. Lockeretz, V. B. Montana and F. M. Pipkin (Harvard)

The reaction $e^- + p \rightarrow e^- + p + X^0$, where X^0 is an undetected meson system of mass $> 1.1 \text{ GeV}$, has been studied for X^0 in the backward direction by detecting the final electron in coincidence with the forward-going proton. Data are presented in the region of virtual photon mass squared from -0.15 to -1.13 GeV^2 , virtual photoproduction center-of-mass energy from 2.20 to 2.55 GeV , and missing mass squared from 1.2 to 2.1 GeV^2 . The dependence on transverse momentum was studied for photon mass squared of -0.35 GeV^2 .

293. FACTORIZATION IN THE INCLUSIVE REACTIONS $\gamma p \rightarrow \pi^- + \text{ANYTHING}$ AND $K^+ p \rightarrow \pi^- + \text{ANYTHING}$
 William P. Swanson (SLAC); Winston Ko, Richard L. Lander, Clifford Risk (University of California, Davis)

The inclusive reactions $\gamma p \rightarrow \pi^- + \text{anything}$ ($\bar{E}_\gamma = 10.5 \text{ GeV}$) and $K^+ p \rightarrow \pi^- + \text{anything}$ ($p_{K^+} = 11.8 \text{ GeV}/c$) are compared for small laboratory momenta. We find that, for $|P(\pi^-)| \leq 0.5 \text{ GeV}/c$, the distributions are similar in shape but differ in magnitude when normalized by their respective asymptotic total cross sections. Deviations in shape occur for $P_\perp > 0.6 \text{ GeV}/c$. The normalized cross sections, integrated over all P_\perp and over $-\infty < P_\parallel < 0.5 \text{ GeV}/c$ are 0.45 ± 0.06 and 0.174 ± 0.02 , respectively, and thus differ by a factor of 2.6 ± 0.3 .